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by area; hence $D = \frac{1}{2} \times 6 \times 4 \times 2 \sqrt{\frac{133}{13} \div \frac{48}{13}} \sqrt{10} = \sqrt{43.225} = 65.7457223 -$.

7. Proposed by WILLIAM HOOVER, A. M., Ph. D., Professor of Mathematics and Astronomy in the Ohio University, Athens, Ohio.

Through each point of the straight line $x=my+h$ is drawn a chord of the parabola $y^2=4ax$, which is bisected in the point. Prove that this chord touches the parabola $(y+2am)^2=8a(x-h)$.

Solution by the Proposer.

Let the chord be $gx+fy=1 \dots (1)$.

This cuts the curve $y^2=4ax \dots (2)$, in the points whose co-ordinates are given by the equations

$$x^2 - \frac{2(g+2af^2)}{g^2}x + \frac{1}{y^2} = 0 \dots (3), \text{ and}$$

$$y^2 + \frac{4af}{g}y - \frac{4a}{g} = 0 \dots (4).$$

The middle of the chord is then $\left(\frac{g+2af^2}{g^2}, -\frac{2ag}{f}\right)$.

If this point be on the line $x=my+h \dots (5)$,

$$\frac{g+2af^2}{g^2} = -\frac{2amf}{g} + h \dots (6),$$

$$\text{or, } g+2af^2 = -2amfg + hg^2 \dots (7).$$

Making this homogeneous by aid of (1),

$$(h-x)\frac{g^2}{f^2} - (y+2am)\frac{g}{f} - 2a = 0 \dots (8), \text{ a quad-}$$

ratic in the undetermined constant $\frac{g}{f}$, and giving the envelope $(y+2am)^2 = 8a(x-h)$.

Also solved by L. E. Pratt, Alfred Hume, G. B. M. Zerr, and J. F. W. Scheffer.

8. Proposed by ADOLPH BAILOFF, Durand, Wisconsin,

If the two exterior angles at the base of a triangle are equal, the triangle is isosceles.

Solution by MISS GRACE H. GRIDLEY, Student in Kidder Institute, Kidder, Missouri; and P. S. BERG, Apple Creek, Ohio.

Let the exterior angles, $\angle ABD$ and $\angle ACE$ of the triangle ABC be equal. To prove the triangle isosceles.

PROOF: $\angle ACE + \angle ACF = 2\text{rt.} < s$.

Also $\angle ABD + \angle ABF = 2\text{rt.} < s$.

$$\therefore \angle ACE + \angle ACF = \angle ABD + \angle ABF.$$

(Things equal to the same thing are equal to each other).

But $\angle ACE = \angle ABD$. (HYP.)

$$\therefore \angle ACF = \angle ABF.$$

(If equals be subtracted from equals, the remainders are equal).

